

light band. The anterior light band is about as wide as the dark. The posterior one is scarcely indicated, being represented by a mere line. The nepionic whorls of the two shells are also different: that of *oregonensis* being papillose while that of the *dupetithouarsi* is wrinkled. The young *oregonensis* is also much larger considering the same number of whorls in the two species. Then too, the sculpture of the adult whorls is quite different; in *oregonensis* we have a surface which is covered by a crinkly epidermis, the crinkles placed obliquely. The lines of growth are irregular and not well marked, while in the *dupetithouarsi* we have regularly impressed lines and none of the crinkled epidermis, the latter being smooth; *dupetithouarsi* has a well-rounded spire while in *oregonensis* it is flattened, etc. I believe that *oregonensis* comes nearer to the group of *E. mormonum* than *E. dupetithouarsi*. You have the types of *cala* and *buttoni*, so I will leave the comparison of them with you."

It seems from the above that we will have to write *oregonensis* in place of *mormonum*, but whether Lea's name applies to the typical middle Californian *mormonum* or to one of the described subspecies remains in doubt. Adult specimens from Oregon are needed to settle this question.

H. A. P.

LAMPASILIS VENTRICOSA (BARNES) IN THE UPPER POTOMAC DRAINAGE.

BY A. E. ORTMANN.

Some time ago the writer reported (Mem. Carnegie Mus., 2, 1906, p. 373) that a western species of crawfish, *Cambarus obscurus* Hagen, is found in the Potomac drainage, in Wills Creek, at Eilerslie, Alleghany Co., Md., and Hyndman, Bedford Co., Pa. This fact was discussed on p. 445 (l. c.), and explained in general terms as an "artificial introduction by human agency." I may add that this crawfish apparently has increased in numbers since its first discovery (August 10, 1904, and May 8, 1905), for on September 7, 1909, I found it very abundantly at Hyndman (for about a mile in the creek above the tannery). And further, on May 6, 1912, this species was seen in the South Branch Potomac at Romney, Hampshire Co., W. Va. Although only a cast-off shell was found, this was of a male of the first form, and positively established the presence of this species at this locality.

A case parallel to this has now come to light: the presence, in the Potomac system, of a western mussel, *Lampsilis ventricosa* (Barnes). This is a form common, for instance, in the Ohio drainage in western Pennsylvania and West Virginia, but it is *not* found in any of the Atlantic river systems investigated by the writer (Delaware, Susquehanna, James). The following records are at hand:

September 4, 1909. Potomac River, Hancock, Washington Co., Md. Here it was in the smaller branch of the river in great numbers and in all sizes, from 41 mm. long upward. About two dozen were taken.

May 9, 1911. South Branch Potomac River, Southbranch, Hampshire Co., W. Va. About a dozen were found within the first mile of the South Branch above its junction with the North Branch. All were of medium size.

August 16, 1911. Shenandoah River, Harper's Ferry, Jefferson Co., W. Va. A single male was found, below medium size.

May 6, 1912. South Branch Potomac River, Romney, Hampshire Co., W. Va. About a dozen were found in a very small branch of the river. Some were rather large, but most of them were quite small (smallest 20 mm. long). These small ones were found all together in fine gravel at the head of a riffle, in shallow water, attached to small pebbles by their byssus.

In other parts of the Potomac drainage, thoroughly investigated, this species was *not found*, and this is especially true for the headwaters of the Shenandoah River and the northern tributaries of the master stream (Antietam, Conococheague and Great Tonoloway Creeks in Pennsylvania and Wills Creek in Maryland).

It is probable that this species will turn up elsewhere in the Potomac. The localities known at present are all to the West of the Blue Ridge Mountain, that is to say, within the Great Allegheny Valley and the Allegheny Mountains. It should be noted, that its representative Atlantic form, *Lampsilis cariosa* (Say), which is so common in the Delaware and Susquehanna, is not found in this region, but is present farther below in the Potomac: I have specimens from Cabin John, Montgomery Co., Md.

There is no question that we have to deal with a form of *Lampsilis ventricosa*. It is true that the Potomac form represents a peculiar type in so far, as all the specimens collected are rather uniform in shape, but the same shape is frequently met with in western speci-

mens, although there is a much greater range of variation in the latter. The Potomac specimens are rather high and short, and their size remains far below that of western *ventricosa*. My largest specimen (a male from Hancock) is 114 mm. long, 82 mm. high, and 58 mm. in diameter, while I have many individuals from western Pennsylvania, which are 150 mm. long and over. Further the posterior ridge of the shell is in the Potomac form a little more distinct than in the average of the western specimens, but again in this character there are western specimens, which agree with the eastern.

In all other particulars the two forms agree, and also the color and color markings (rays) of the epidermis are the same, and quite variable. But on account of the small size, the shorter and higher outline, and somewhat more distinct posterior ridge, we might regard the Potomac-race as a variety, which I propose to call: *Lampsilis ventricosa cohongoronta* (an old Indian name of the Potomac). I may add, that I have investigated the anatomy, of males, sterile and gravid females, and that there is no difference whatever. Also the glochidia are the same.

It is evident that this shell is, zoögeographically, out of place in the Potomac, and, considered together with the case of the western crawfish mentioned above, we must conclude that both are artificial introductions into this river, probably quite accidental, and the idea is suggested that *the shell might have been transported in the larval stage, as glochidium, during its parasitic life upon certain fishes*. Western species of fishes have repeatedly been transplanted into the Potomac system. H. M. Smith and B. A. Bean (Bull. U. S. Fish Comm. 18 (or 1898) 1899 pp. 179-187) mention no less than seven species (disregarding four European), and among them are the following: Rock Bass (*Ambloplites rupestris* (Raf.)), Large mouth Black Bass *Micropterus salmoides* (Lac.), and Crappie (*Pomoxis annularis* Raf.).

Now just these have recently been given by G. Lefevre and W. C. Curtis (Bull. Bur. Fisheries, 30, 1912, pp. 157 and 160) as most susceptible to infection with the glochidia of species of *Lampsilis*, among them *Lampsilis ventricosa*. The introduction of Black Bass was in the Shenandoah River in 1889; that of the other two fishes in various parts of the Potomac and the Chesapeake-Ohio Canal chiefly in 1894. I do not hesitate to attribute to this fact, the transplantation of certain western fishes, the accidental introduction of

glochidia of this mussel, which found in this region congenial environment, and thus the mussel became established and is propagating. In the western waters, *L. ventricosa* prefers similar ecological conditions: rivers and streams of medium or small size, with riffles and rapidly flowing water, and gravelly bottom.

Very likely the same cause accounts for the accidental introduction of *Cambarus obscurus*; in seining for bass, for instance, in western Pennsylvania, it would be quite impossible *not* to catch a number of this crawfish.

This is an interesting instance of the stocking of a stream with a mussel species by the help of fish. Lefevre and Curtis (l. c., p. 192) discuss this way as a possible means of mussel transportation; however, they express some doubt as to its practicability. But here we have, apparently, the demonstration that this *is* possible, and having happened once quite by accident, it is to be expected that it also might be successfully accomplished when intended and done with the proper care.

NEW ENGLAND NOTES.

BY REV. HENRY W. WINKLEY.

A careful search at Wood's Holl and Chatham, on Cape Cod, reveals more specimens of the species described as *Pyramidella* (*Sulcorinella*) *bartschi*. These have been compared with the type by Dr. Bartsch as well as myself, and they show it to be an *Odostomia*. The name is therefore changed to *Odostomia* (*Evalea*) *bartschi*. Mr. W. F. Clapp has also found it within the cape.

Short trips to a few points reveal *Odostomias*, and their distribution should be noted. The four species, *Odostomia trifida*, *bisuturalis*, *winkleyi* and *P. fusca*, are to be found at low tide in inner waters as follows: In a small creek in the marsh near the station at Rowley, Mass. (This same spot is the most northerly locality where I have found *Paludestrina salsa*.)

At old Newbury, Mass., in the Parker River, in eel-grass patches, is another colony. The third is in Great Bay, New Hampshire, at a spot half way between Dover and Portsmouth.

Last summer I obtained the best lot of *Pyramidellidæ* I have ever seen. My stay at Chatham was short, and confined to low-tide col-